

Implementation and Evaluation

of the First Three Years of a Population-Based Intervention to Reduce Cardiovascular Disease:

The Heart of New Ulm Project

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BACKGROUND

- Coronary Heart Disease (CHD) and its associated risk factors represent the principle drivers of mortality and healthcare costs in the United States. CHD is largely an avoidable chronic health condition. Estimates attribute 90% of first heart attacks to just nine modifiable risk factors.
- Better control of CHD risk factors across entire populations will result in reduced incidence and mortality of CHD altogether.
- Most published cardiovascular research is focused on innovative technological therapies for patients with existing disease. There are gaps in innovative dissemination/utilization of established therapies to the masses, most of whom do not have disease. To date, most prevention efforts have been only moderately successful. While mortality rates have decreased, there has been limited success reducing myocardial infarctions (MI) or heart disease incidence.

Hearts Beat Back: The Heart of New Ulm (HONU) Project is a 10-year population-based demonstration project aimed at reducing MI and CHD in the rural community of New Ulm, MN.

- The long-term (10-year) goal is to reduce acute MI rates.
- The moderate-term (5-year) goal is to reduce modifiable CHD risk factors at the community level.
- The target audience is residents of the 56073 zip code who are age 40-79, the age group most likely to experience a preventable heart attack. However many HONU interventions are open to or address the whole community.

THE HEART OF NEW ULM PROJECT – INTERVENTIONS

HONU interventions are based on evidence-informed health improvement practices and the community's level of risk and preferences. HONU's intervention package is informed by the Minnesota Heart Health Program, North Karelia Project, Stanford 5-City Project, and other large scale heart health programs.

Interventions are delivered through healthcare, worksites, and the community addressing many levels ranging from individual education to social reengineering and policy in alignment with a social ecological model. Interventions use both a population-based and a targeted approach to prevention with a plan for sustainability.

A "community diagnosis" developed from 2009 heart health screenings with 5,198 participants indicated the highest risks for the population were:

- high rate of obesity
- low fruit and vegetable consumption
- high prevalence of metabolic syndrome
- underutilization of preventive medical therapies among those at high risk

As a result interventions were selected to focus on improving the food environment, reducing obesity rates, and improving medical management of those at high cardiometabolic risk.

Interventions Delivered at the Community Level

Intervention	Implementation and Participation
Heart Health Screenings	Assess heart disease risk factors, educate individuals on their risk level, health coaching. 5221 screened in 2009, 3215 screened in 2011.
Community Health Summits	Annual community wide inspirational events focused on lifestyle changes. Speakers included Dan Buettner from National Geographic's Blue Zones and Danny Cahill winner of season 8 of "The Biggest Loser". Attendance ranged from 400-700.
Formal Run/ Walk events	5 run/ walk events held from 2009-2011 with registrations ranging from 150 - 600.
Community Health Challenges	6 total Health Challenges offered to the community as broad annual campaigns with 6-8 week behavior change programming that can be followed encouraging small manageable changes. Enrollment ranged from 539 to 3901.
General Education	Cooking classes, grocery store tours, and presentations on a variety of topics. "What's cooking New Ulm TV Show" is presented on local cable access 7 times per week with 64 new episodes in 2010 and 2011.
Small Community Events	NU divided into 25 districts with trained volunteer leaders who promote opportunities for exercise/healthy events such as a physical activity class, walking clubs, healthy potluck, dance-a-thon.
Food environment Improvement	Works with restaurants, grocery stores and convenience stores to improve healthy options available and promote those options to residents.

Interventions Delivered at the Worksite Level

Intervention	Implementation
Conducted WELCOA Assessments	46 businesses completed an assessment of their wellness policies and environment. Results included recommendations on steps to improve their worksite wellness programming.
Heart Health Screenings conducted at worksites	29 worksites participated in 2009 and 28 participated in 2011. Over 3500 employees were screened. Reports given to each worksite showing prevalence of risk factors among employees with recommendations for wellness programming targeting those risk levels.
Worksite behavioral change programs	6-8 week behavior change programs focused on weight loss, nutrition, or exercise. 8 behavior change programs were implemented at 30 worksites from 2009-2011, with 2543 employees participating.
Business leader engagement and education	Annual Employer summits with motivational speakers, attended by 23-26 companies over past 3 years. 5 educational events offered through the Chamber of Commerce. Attendance ranged from 36 to 34 companies.

Interventions Delivered at the Healthcare Level

Intervention	Implementation
HeartBeat Connections	Phone coaching program targeting patients at high cardiometabolic risk but without CHD. Goals are to improve use of preventive medications and lifestyle-related risks. Served 350 patients from August 2010 – December 2011.
Grand Rounds	Since 2009, 9 HONU Grand Rounds events have been conducted. Over 90% of local providers have attended at least one session, with the majority attending 4 or more. Topics covered range from rural healthcare disparities to the treatment of metabolic syndrome and cholesterol disorders.

RESULTS

Evaluation of CHD risk factor trends use two sources of data: heart health screenings and electronic health records (EHR). Data from both sources are limited to residents of the 56073 zip code who are age 40-79. Screening data is limited to the cohort of individuals who were 40-79 at the time of the 2009 screening and returned in 2011. EHR trends are monitored for 2008-2009 compared to 2010-2011 using cross-sectional samples of individuals who were age 40-79 during each time period and had a visit to the NUMC during those times.

Results Assessed by Heart Health Screening Data

- 7,855 people age 40-79 reside in the target zip code according to 2010 Census data.
- 3,123 residents age 40-79 participated in 2009 screenings (40%).
- 1,455 of those returned for screening in 2011 (47% of initial screeners, 19% of population)
- People returning for screening in 2011 were more likely to be female, less likely to be smokers, be obese or have diabetes. Returnees had slightly healthier behaviors at baseline but were also more likely to have high cholesterol at baseline.
- Mean age in 2009 was 56.3.

Prevalence of modifiable CHD risk factors from heart health screenings, data from the cohort of residents age 40-79 attending both 2009 and 2011 screening events

Biometric Factors (in %)	Total n = 1455 (100%)			Females n = 918 (63%)			Males n = 537 (37%)		
	2009	2011	Δ (†11-'09)	2009	2011	Δ (†11-'09)	2009	2011	Δ (†11-'09)
Current Smoker † † †	5.8	4.7	-1.1	5.5	4.6	-0.9	6.2	4.7	-1.5
High Stress Level † † †	10.5	7.7	-2.8	12.6	8.3	-4.3	7.0	6.8	-0.2
5+ Fruit & Veg/day † † †	18.6	32.8	14.2	22.6	39.0	16.4	11.7	22.1	10.4
Exercise > 150 min/wk † † †	66.8	76.6	9.8	65.4	76.5	11.1	69.2	76.8	7.6
Medication Use (in %)									
Daily Aspirin † † †	31.7	40.2	8.5	26.0	34.0	8.0	41.2	50.5	9.3
Diabetes meds † † †	4.7	7.3	2.6	4.8	6.8	2.0	4.7	8.2	3.5
Cholesterol meds † † †	21.6	28.7	7.1	17.9	25.5	7.6	27.9	34.3	6.4
Hypertension meds † † †	28.6	33.9	5.3	27.2	30.9	3.7	30.9	38.9	8.0
Poor medication adherence † † †	31.5	28.9	-2.6	31.9	24.7	-7.2	31.1	34.7	3.6
Biometric Factors (in %)									
Obese (BMI > 30 kg/m ²)	37.9	36.8	-1.1	36.3	35.2	-1.1	40.6	39.5	-1.1
Hypertension (> 140/90 mmHg) † † †	25.9	19.5	-6.4	23.5	19.1	-4.4	29.9	20.2	-9.7
High Cholesterol (> 240 mg/dL) † † †	15.4	10.9	-4.5	18.4	13.5	-4.9	10.2	6.3	-3.9
High LDL (> 130 mg/dL) † † †	40.2	35.5	-4.7	40.7	38.5	-2.2	39.3	30.3	-9.0
hs-CRP (> 3 mg/dL) † † †	29.4	25.8	-3.6	33.0	27.9	-5.1	23.3	22.2	-1.1
High Glucose (> 100 mg/dL) † † †	29.3	25.4	-3.9	24.6	20.5	-4.1	37.4	33.7	-3.7
High Trig (> 150 mg/dL) † † †	30.0	26.4	-3.6	27.3	22.8	-4.5	34.8	32.4	-2.4

(-)Decreased change from baseline (2009); (+)Increased change from baseline (2009)
† significant change at $\alpha = 0.05$ for females; *significant change at $\alpha = 0.05$ for males
† † changes differ by gender at $\alpha = 0.05$
† † † significant change at $\alpha = 0.05$ for total group from 2009 to 2011.

Results Assessed by Electronic Health Record Data

- 5,921 residents age 40-79 had medical visits in 2008/09 which is approximately 75% of the Census population for the zip code/ age group.
- 6,336 residents age 40-79 had medical visits in 2010/11 (81% of the population).
- Residents with medical visits were 54% female and 46% male, with a mean age of 57.1 for both the 2008/09 and 2010/11 data sets.
- Data for CHD risk factors were available for 71% - 98% of those with visits depending on the specific risk factor.

Prevalence of modifiable CHD risk factors using cross-sectional EHR data of residents age 40-79

	Total		Females		Males	
	2008/09	2010/11	2008/09	2010/11	2008/09	2010/11
Residents with a visit during the specified years ^a	n = 5921	n = 6336	n = 3207	n = 3392	n = 2714	n = 2944
Behavioral Factors (in %)						
Current Smoker	15.3	14.9	-0.4	13.2	12.9	-0.3
Biometric Factors (in %)						
Obese (BMI > 30 kg/m ²)	44.8	44.5	-0.3	42.7	42.5	-0.2
Hypertension †	20.6	17.9	-2.7	19.2	16.3	-2.9
High Cholesterol (> 240 mg/dL) † †	10.8	8.6	-2.2	13.8	11	-2.8
High LDL (> 130 mg/dL) † †	31.1	27.7	-3.4	33.6	30.8	-2.8
High Glucose (> 100 mg/dL)	46.8	45.0	-1.8	40.5	38.8	-1.7
High Trig †	33.9	31.9	-2.0	30.9	28.7	-2.2

^a Patients selected if they had at least one of the following types of visits during the specified time period: hospital, medical clinic, ED, hospital outpatient, or nurse/clinic staff only
(-)Decreased change from baseline (2008/09); (+)Increased change from baseline (2008/09)
† significant change at $\alpha = 0.05$ for 2008/09 values compared to 2010/11 values.
† † significant change at $\alpha = 0.05$ for females; *significant change at $\alpha = 0.05$ for males
† † † changes differ by gender at $\alpha = 0.05$

CONCLUSIONS

- During the first 3 years, HONU implemented a wide variety of interventions through several implementation models, targeting the highest risk factors in the community. Interventions reached a large proportion of the population and were well received by residents.
- Monitoring trends through both the community screening and EHR data sources show positive improvements in several biometric risk factors, especially for hypertension, total cholesterol, LDL, and triglycerides.
- Screening data likely reflect a healthy participant bias but helps identify changes in behavioral risk factors not captured in the EHR and can identify what might be driving some of the trends seen in the EHR data.
- EHR data represents a larger proportion of the target population, but does not contain some important measures on behavioral risk factors.
- Trends seen in the EHR data compare favorably to national trends.

– National trends for uncontrolled blood pressure have been stable for the past decade, while EHR data indicates a 2.7 percentage point drop in a 4 year period.

– National data shows a 1.2 percentage point decline in uncontrolled cholesterol (> 240) in 40-59 year olds and a 0.6 decline among those age 60+ from 2007 – 2010. HONU EHR data shows a drop of 2.2 percentage points for those age 40-79.

– National data on obesity for adults age 20-74 show an increase from 34.3% obese in 2007/2008 to 36.1% in 2009/2010. While obesity is still higher in the HONU community, the stable trend in New Ulm is a positive contrast from a national increase.